Claims

1. Signaling system for automated location-dependent recognition of flood risks, flood states being transmitted to a central unit (20) and location-dependent flood probability values being determined, characterized

in that the central unit (20) comprises a multi-dimensional lookup table (203) corresponding to a spatial high resolution grid (60/61) based on decentralized measurements of flood risk factors of a specific territory whereas the flood risk factors (P) being associated with the grid indicating the averaged flood frequency and/or susceptibility to flooding within a grid cell (60/61),

in that the system comprises distributed gauging stations (5/30/31/32), , whereas river discharge parameters (T) are measurable by the distributed gauging stations (5/30/31/32), within a grid cell (60/61) and transmitted over a network (50) to the central unit (20), the river discharge parameters comprising at least values for return period and/or intensity of measured events,

in that the central unit (20) comprises a correlation-module (21) generating an event-specific averaged probabilistic water depth value (H) for an flood event based on the linked flood risk factors and the river discharge values, and associating the probabilistic water depth value (H) to the corresponding grid cell (60/61), and

in that the system comprises an cell arbitrator module (22) accting on at least on grid-based composition module (23) according to the avaraged probabilistic water depth values (H).

2. System according to claim 1, characterized in that the grid-based composition module (23) comprises at least an early warning system signaling flood risk in the appropriate cell (60/61).

3. System according to claim 1, characterized in that the grid-based composition module (23) comprises automated damage prediction systems and/or damage covering systems for land-based installations based upon at least the flood risk factors.

4. System according to one of the claims 1 to 3, characterized in that the grid-based composition module (23) comprises at least an optimization and/or control module for protection installation of technical and/or industrial facilities based upon at least the flood risk factors.

5. System according to on of the claims 1 to 4, characterized in that the system comprises a linking module with at least one adaptable event factor providing the spatial and/or temporal correlations for the discharge measurements of different gauging stations (5/30/31/32), .

6. System according to one of the claims 1 or 5, characterized in that the gauging stations (5/30/31/32), comprise at least a sensor and/or measuring fixture to measure river water level parameters, based upon which river water level parameters the river discharge parameters are determined.

7. System according to one of the claims 1 to 6, characterized in that the grid of the gauging stations (5/30/31/32), measuring the river discharge parameters (T) are located in a low spatial resolution in relation to the grid (60/61) of the flood risk factors.

8. System according to one of the claims 1 to 7, characterized in that the grid (60/61) of the gauging stations (5/30/31/32), measuring the river discharge parameters (T) are set to a high temporal resolution.

9. System according to one of the claims 1 to 8, characterized in that the resolution of the grid (60/61) of the flood risk factors is given by cell sizes below $10'000m^2$.

10. System according to one of the claims 1 to 9, characterized in that the flood risk factors (P) are derived based upon at least geomorphologic parameters.

11. System according to claim 10, characterized in that the geomorphologic parameters comprise horizontal distance and/or elevation difference to the next river.

12. System according to on of the claims 10 or 11, characterized in that the geomorphologic parameters comprise horizontal distance and/or elevation difference to the next drainage area.

13. System according to one of the claims 1 to 12, characterized in that the central unit (20) comprises an interpolation module deriving the flood risk factors (P) based upon a country-specific flood zone table depending on horizontal distance and/or elevation difference.

14. System according to claim 13, characterized in that the country specific flood zone table comprises the First American 100-year flood zone table.

15. System according to one of the claims 1 to 14, characterized in that the correlation module comprises at least four adaptable correlation parameters $X_1, X_2, \ldots, X_5$, whereas the adaptable parameters are correlated by

$$H = \max\left(\frac{x_1 P - x_2 + x_3 \ln(T)}{x_4 P + x_5}, 0\right).$$

16. System according to one of the claims 1 to 15, characterized in that vulnerability factors are determined based upon historical dataset of corresponding portfolios and a generalized insurance risk is automated derivable from the vulnerability factors.

17. System according to one of the claims 1 to 16, characterized in that the system comprises different correlation modules for flood cell zones along a cost located different height m a. s. l..

18. System according to claim to 17, characterized in that the system comprises at least one specific correlation module determing flood cell zones along a cost located lower than 10 m a. s. l..

19. System according to one of the claims 17 or 18, characterized in that the determination of the flood cells along a cost are additionally based upon storm surge events.

20. System according to one of the claims 17 to 19, characterized in that the determination of the flood cells along a cost additionally comprises a Sea, Lake and Overland Surges from Hurricanes (SLOSH) method.

21. System according to one of the claims 1 to 20, characterized in that the system is accessable over a network (51) by client nodes (40/41/42), whereas the system comprises a billing module with a billing gateway interface for access to the central unit (20) first call datail records of a client node being transmittable from the central unit (20) to the billing module.

22. System according to claim 21, characterized in that by means of a proxy module of the system second call detail records of the client node (40/41/42) are downloadable from the central unit (20) by means of the proxy module at least the identity of the client node and/or duration of the access to the central unit (20) and/or service being able to be captured and able to be passed on to the billing module.

23. System according to claim 22, characterized in that by means of the billing module of the system TAP files corresponding to the obtained service are able to be generated, an these are transmittable, together with billing instructions, to a clearing module, the billing instructions including at least user-specific and/or service-provider-specific billing data.

24. Method for automated location dependent recognition of flood risks, flood states being measured and location-dependent flood probability values being determined, characterized

in that a spatial high resolution grid (60/61) is generated for a specific territory and flood risk factors (P) are associated with the grid (60/61), the flood risk factors indicating the average flood frequency and/or susceptibility to flooding within a grid cell (60/61),

in that river discharge parameters (T) are determined by measurments of distributed gauging stations (5/30/31/32), , the river discharge parameters comprising at least values for return period and/or intensity of measured and/or stochastically generated events, and

in that the flood risk factors and the river discharge values are linked by a correlation module to generate an event-specific averaged probabilistic water depth value (H) for an event.

25. Method according to claim 24, characterized in that a linking module comprises at least one adaptable event factor providing the spatial and/or temporal correlations for the discharge measurements of different gauging stations (5/30/31/32), .

26. Method according to one of the claims 24 or 25, characterized in that river water level parameters are measured by the gauging stations (5/30/31/32), , based upon which river water level parameters the river discharge parameters are determined.

27. Method according to one of the claims 24 to 26, characterized in that the river discharge parameters (T) are measured and/or determined in a low spatial resolution in relation to the grid (60/61) of the flood risk factors.

28. Method according to one of the claims 24 to 27, characterized in that the river discharge parameters (T) are measured and/or determined in a high temporal resolution.

29. Method according to one of the claims 24 to 28, characterized in that the resolution of the grid (60/61) is given by cell sizes below 10'00Om^2.

30. Method according to one of the claims 24 to 29, characterized in that the flood risk factors (P) are derived based upon at least geomorphologic parameters.

31. Method according to claim 30, characterized in that the geomorphologic parameters comprise horizontal distance and/or elevation difference to the next river.

32. Method according to on of the claims 30 or 31, characterized in that the geomorphologic parameters comprise horizontal distance and/or elevation difference to the next drainage area.

33. Method according to one of the claims 24 to 32, characterized in that the flood risk factors (P) are derived by an interpolation module based upon a country-specific flood zone table depending on horizontal distance and/or elevation difference.

34. Method according to claim 33, characterized in that the country specific flood zone table comprises the First American 100-year flood zone table.

35. Method according to one of the claims 24 to 34, characterized in that the correlation module comprises at least four adaptable correlation parameters xi, X_2, ..., Xs, whereas the adaptable parameters are correlated by

$$H_{\max}\left(\frac{x_1 P - x_2 + x_3 \ln(r)}{x_4 P + x_5}, \theta_j\right).$$

36. Method according to one of the claims 24 to 35, characterized in that vulnerability factors are determined based upon historical dataset of corresponding portfolios and a generalized insurance risk is automated derivable from the vulnerability factors.

37. Method according to one of the claims 24 to 36, characterized different correlation modules are used for flood cell zones along a cost located different height m a. s. l..

38. Method according to claim to 37, characterized in that flood cell zones along a cost located lower than 10 m a. s. l. are determined by a specific correlation module.

39. Method according to one of the claims 37 or 38, characterized in that the determination of the flood cells along a cost are additionally based upon storm surge events.

40. Method according to one of the claims 37 to 39, characterized in that the determination of the flood cells along a cost additionally comprises a Sea, Lake and Overland Surges from Hurricanes (SLOSH) method.

41. A computer program product which is able to be loaded in the internal memory of a digital computer and comprises software code sections

with which the steps according to one of the claims 24 to 40 are able to be carried out when the product runs on a computer.